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Frank S. DiGiglio, Esq.
Scully, Scott, Murphy & Presser
400 Garden City Plaza
Garden City, NY 11530

EXAMINER	
CHOJNACKI, MELLISSA M	

ART UNIT	PAPER NUMBER
2175	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/079,458	MICKA, WILLIAM FRANK	
	Examiner	Art Unit	
	Mellissa M Chojnacki	2175	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-52 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-52 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

SAM RIMELL
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The arrangement of the disclosed application does not conform with 37 CFR 1.77(b).

Section headings are underlined and boldfaced throughout the disclosed specification.

Section headings should not be underlined and/or **boldfaced**. Appropriate corrections are required according to the guidelines provided below:

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(e) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(f) BRIEF SUMMARY OF THE INVENTION.

(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(h) DETAILED DESCRIPTION OF THE INVENTION.
(i) CLAIM OR CLAIMS (commencing on a separate sheet).
(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

3. The abstract contains more than 150 words. The abstract should contain 150 words or less. Appropriate corrections are required according to the guidelines provided below:

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

> the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. (U.S. Patent No. 6,446,176) in view of Milillo et al. (U.S. Patent No. 6,643,671).

As to claim 1, West et al. teaches a method for synchronously transmitting one or more incremental database updates from a primary volume at a primary site to a remote volume at a remote site, the primary site and the remote site interconnected by at least one communication link (See abstract, where "databases" is read on "storage "), the method comprising the steps of:

wherein the one or more incremental database updates at the primary volume of the primary site are decoupled from transmission of the one or more incremental database updates to the remote volume at the remote site (See column 6, lines 1-14).

West et al. does not teach destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

Milillo et al. teaches a system and method for synchronizing a data copy using an accumulation remote copy trio consistency group (See abstract), in which he teaches

(a) destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data (See column 2, lines 44-53, lines 58-67);

(b) transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update (See column 4, lines 47-60; column 8, lines 42-60); and

(c) synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap (See column 2, lines 43-67; column 4, lines 47-60),

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified West et al., to include destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the

remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified West et al., by the teachings of Milillo et al. because destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap would migrate data to a secondary storage system having multiple volumes for disaster recovery purposes much quicker to facilitate smaller incremental backups (See Milillo et al., column 3, lines 19-28).

As to claims 2, 19 and 37 West et al. as modified, teaches wherein the first bitmap represents a FlashCopy bitmap and the second bitmap represents a PPRC bitmap (See Milillo et al., column 2, lines 44-50, where "FlashCopy" is read on "snapshot").

As to claims 3, 20 and 38, West et al. as modified, teaches the method further comprising a step of flashcopying the primary volume at the primary site to a target volume at the primary site for the current database update (See Milillo et al., column 2, lines 44-50; column 3, lines 21-30; column 7, lines 66-67; column 8, lines 1-9; column 9, lines 24-34).

As to claims 4, 21 and 39, West et al. as modified, teaches wherein the step of flashcopying initializes the one or more bits in the FlashCopy bitmap (See Milillo et al., column 2, lines 44-53, where "flashcopying" is read on "snapshot copy"; column 4, lines 47-60); the system further comprising a means of flashcopying the primary volume at the primary site to a target volume at the primary site for the current database update (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60).

As to claims 5, 22 and 40, West et al. as modified, teaches the method further comprising a step of flashcopying remote volume at the remote site to a target volume at the remote site for the current database update (See Milillo et al., column 2, lines 44-53, where "flashcopying" is read on "snapshot copy"; column 4, lines 47-60; column 8, lines 29-60); the system further comprising a remote controller associated with the remote site comprising a means for flashcopying the remote volume at the remote, site to a target volume at the remote site for the current database update (See Milillo et al., column 2, lines 44-53, where "flashcopying" is read on "snapshot copy"; column 4, lines 47-60; column 8, lines 29-60).

As to claims 6, 23 and 41, West et al. as modified, teaches the method further comprising a step of providing an application host that is coupled to primary volume for performing the one or more database updates at the primary volume (See West et al. abstract; column 1, lines 45-52; column 1, lines 58-67; column 2, lines 1-2, lines 17-24; also see Milillo et al., column 1, lines 56-67; column 2, lines 1-6); the system further comprising an application host that is coupled to primary volume for performing the one or more database updates at the primary volume (See West et al. abstract; column 1, lines 45-52; column 1, lines 58-67; column 2, lines 1-2, lines 17-24; also see Milillo et al., column 1, lines 56-67; column 2, lines 1-6).

As to claims 7, 24 and 42, West et al. as modified, teaches the method further comprising a step of staggering the one or more database updates during the current database update (See West et al. column 9, lines 48-61; also see Milillo et al., column 9, lines 24-47); the system further comprising a means for staggering the one or more database updates during the current database update (See West et al. column 9, lines 48-61; also see Milillo et al., column 9, lines 24-47).

As to claims 8, 25 and 43, West et al. as modified, teaches wherein the step of staggering comprises the steps of:

determining whether a synchronization for a previous database update is complete after performing the step of destaging for the current database update (See West et al., column 9, lines 39-42); and

waiting for the synchronization of the previous database update to complete before the step of transferring the first bitmap to the second bitmap for the current database update (See West et al., column 9, lines 39-42; also see Milillo et al., column 1, lines 56-67; column 2, lines 1-6);

wherein the means for staggering comprises:

means for determining whether a synchronization for a previous database update is complete after performing the step of destaging for the current database update (See West et al., column 9, lines 39-42); and

means for waiting for the synchronization of the previous database update to complete before the step of transferring the first bitmap to the second bitmap for the current database update (See West et al., column 9, lines 39-42; also see Milillo et al., column 1, lines 56-67; column 2, lines 1-6).

As to claims 9, 26 and 44, West et al. as modified, teaches the step of staggering further comprising a step of:

flashcopying, the primary volume at the primary site to a secondary volume at the primary site and initializing the first bitmap for a next database update after the transferring step for the current database update (See Milillo et al., column 2, lines 44-

53; column 4, lines 47-60; column 8, lines 42-60, where "flashcopying" is read on "snapshot copying");and

waiting for the next database update after the synchronizing step for the current database update (See West et al., column 9, lines 39-42);

the means for staggering further comprising:

means for flashcopying the primary volume at the primary site to a secondary volume at the primary site and initializing the first bitmap for a next database update after the transferring step for the current database update (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60; column 8, lines 42-60, where "flashcopying" is read on "snapshot copying"); and

means for waiting for the next database update after the synchronizing step for the current database update (See West et al., column 9, lines 39-42).

As to claims 10, 27 and 45, West et al. as modified, teaches the method further comprising a step of establishing a peer to peer remote copy session between the target volume at the primary site and the remote volume at the remote site for physically transmitting the modified data over the at least one communication link to the remote volume for the current database update (See West et al., column 1, lines 10-15; column 2, lines 49-67; column 9, lines 43-61; also see Milillo et al., column 1, lines 35-48, lines 56-67; column 2, lines 1-6); the controller further comprising a peer to peer remote copy adapter for establishing a peer to peer remote copy session between the target volume at the primary site and the remote volume at the remote site to physically transmit the

modified data over the at least one communication link to the remote volume for the current database update (See West et al., column 1, lines 10-15; column 2, lines 49-67; column 9, lines 43-61; also see Milillo et al., column 1, lines 35-48, lines 56-67; column 2, lines 1-6).

As to claims 11, 28 and 46, West et al. as modified, teaches the method further comprising a step of providing a controller at the primary site for managing access to both the primary volume and the target volume at the primary site (See West et al., column 4, lines 47-62; column 5, lines 7-14; also see Milillo et al., column 3, lines 35-49; column 6, lines 53-67); wherein the controller at the primary site comprises a device adapter for managing access to both the primary volume and the target volume at the primary site (See West et al., column 4, lines 47-62, where "adapter" is read on "interface"; column 5, lines 7-14; also see Milillo et al., column 3, lines 35-49; column 6, lines 53-67).

As to claims 12, 29 and 47, West et al. as modified, teaches the method further comprising a step of providing a controller at the remote site for managing access to the remote volume and a target volume at the remote site (See West et al., column 5, lines 7-14; also see Milillo et al., column 3, lines 35-49; column 6, lines 53-67); wherein the remote controller at the remote site comprises a device adapter for managing access to the remote volume and a target volume at the remote site (See West et al., column 5, lines 7-14; also see Milillo et al., column 3, lines 35-49; column 6, lines 53-67).

As to claims 13, 30 and 48, West et al. as modified, teaches the method further comprising the steps of:

initializing the first bitmap to indicate that all data on the primary volume at the primary site is to be copied to the remote volume at the remote site (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60);

synchronizing the data from the primary volume at the primary site to the remote volume at the remote site (See Milillo et al., column 2, lines 58-63; column 4, lines 47-60); and

flashcopying the remote volume at the remote site to a target volume at the remote site (See Milillo et al., column 8, lines 42-60, where "flashcopying" is read on "snapshot copying");

wherein the local controller associated with the primary site further comprises:

means for initializing the first bitmap to indicate that all data on the primary volume at the primary site is to be copied to the remote volume at the remote site (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60);

means for synchronizing the data from the primary volume at the primary site to the remote volume at the remote site (See Milillo et al., column 2, lines 58-63; column 4, lines 47-60); and

means for flashcopying the remote volume at the remote site to a target volume at the remote site (See Milillo et al., column 8, lines 42-60, where "flashcopying" is read on "snapshot copying").

As to claims 14, 31 and 49, West et al. as modified, teaches the method further comprising a step of providing a recovery host that is coupled to the target volume at the remote site for recovering from a failure of the primary site by providing access the transmitted incremental database updates from the primary site (See West et al., column 1, lines 38-44; also see Milillo et al., column 8, lines 42-67, where "recovery host" is read on "recovery operation"; column 10, lines 38-54).

As to claims 15, 32 and 50, West et al. as modified, teaches the method further comprising a step of automatically initiating the incremental data update (See Milillo et al., column 15, lines 20-23); the system further comprising a means for automatically initiating the incremental data update (See Milillo et al., column 15, lines 20-23).

As to claims 16, 33 and 51, West et al. as modified, teaches the step of destaging further comprising the steps of:

inspecting the one or more bits of the first bitmap at the primary site to determine whether a target volume at the primary site includes the modified data (See Milillo et al., column 2, lines 44-53, lines 58-67); and

copying data that is to be overwritten with modified data to the target volume at the primary site if the first bitmap indicates that the target volume does not include the data to be overwritten (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60);

wherein the destaging further compromises:

means for inspecting the one or more bits of the first bitmap at the primary site to determine whether a target volume at the primary site includes the modified data (See Milillo et al., column 2, lines 44-53, lines 58-67); and

means for copying data that is to be overwritten with modified data to the target volume at the primary site if the first bitmap indicates that the target volume does not include the data to be overwritten (See Milillo et al., column 2, lines 44-53; column 4, lines 47-60).

As to claims 17, 34 and 52, West et al. as modified, teaches wherein the at least one communication link is selected form the group consisting of: a channel link; a T1/T3 link; a Fibre channel; and an ESCON link (See West et al., column 4, lines 11-15; lines 56-60).

As to claim 18, West et al. teaches a system for asynchronously transmitting one or more incremental database updates from a primary volume at a primary site to a remote volume at a remote site, the primary site and the remote site interconnected by at least one communication link (See abstract, where "databases" is read on "storage "), the system comprising:

a local controller associated with the primary site (See column 4, lines 51-62, lines 64-67; column 5, lines 1-3; It is inherent that "disks drives" require a "controller") comprising:

wherein the one or more incremental database updates at the primary volume

of the primary site are decoupled from transmission of the one or more incremental database updates to the remote volume at the remote site (See column 6, lines 1-14).

West et al. does not teach a means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; a means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and a means for synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

Milillo et al. teaches a system and method for synchronizing a data copy using an accumulation remote copy trio consistency group (See abstract), in which he teaches

a means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data (See column 2, lines 44-53, lines 58-67);

a means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update(See column 4, lines 47-60; column 8, lines 42-60); and

a means for synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second

bitmap, (See column 2, lines 43-67; column 4, lines 47-60),

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified West et al., to include a means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; a means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and a means for synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified West et al., by the teachings of Milillo et al. because a means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; a means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote

volume at the remote site for the current database update; and a means for synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap would migrate data to a secondary storage system having multiple volumes for disaster recovery purposes much quicker to facilitate smaller incremental backups (See Milillo et al., column 3, lines 19-28).

As to claim 35, West et al. teaches a controller associated with a primary site for asynchronously transmitting one or more incremental database updates from a primary volume at the primary site to a remote volume at a remote site, the primary site and the remote site interconnected by at least one communication link (See abstract, where "databases" is read on "storage "; also see column 4, lines 51-62, lines 64-67; column 5, lines 1-3; It is inherent that "disks drives" require a "controller"), the controller comprising:

wherein the one or more incremental database updates at the primary volume of the primary site are decoupled from transmission of the one or more incremental database updates to the remote volume at the remote site (See column 6, lines 1-14).

West et al. does not teach means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; means for transferring the first bitmap to a second

bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site far the; current database update; and means for synchronizing the primary volume at the primary site with the remote volume at the remote; site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

Milillo et al. teaches a system and method for synchronizing a data copy using an accumulation remote copy trio consistency group (See abstract), in which he teaches means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data (See column 2, lines 44-53, lines 58-67);

means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site far the; current database update(See column 4, lines 47-60; column 8, lines 42-60); and

means for synchronizing the primary volume at the primary site with the remote volume at the remote; site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap (See column 2, lines 43-67; column 4, lines 47-60).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified West et al., to include means for destaging modified data to the primary volume for a current database update and

updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site far the; current database update; and means for synchronizing the primary volume at the primary site with the remote volume at the remote; site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified West et al., by the teachings of Milillo et al. because means for destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; means for transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site far the; current database update; and means for synchronizing the primary volume at the primary site with the remote volume at the remote; site for the current database update by transmitting the modified data to the remote volume as indicated by one or more bits in the second bitmap would migrate data to a secondary storage system having multiple volumes for disaster recovery purposes much quicker to facilitate smaller incremental backups (See Milillo et al., column 3, lines 19-28).

As to claim 36, West et al. teaches a program storage device, tangibly embodying a program of instructions executable by a machine to perform a method for asynchronously transmitting one or more incrernental database updates from a primary volume at a primary site to a remote volume at a remote site, the primary site and the remote site interconnected by at least one communication link (See abstract, where "databases" is read on "storage "; also see column 4, lines 51-62, lines 64-67; column 5, lines 1-3; It is inherent that "disks drives" require a "controller"), the method comprising the steps of:

wherein the one or more incremental database updates at the primary volume of the primary site are decoupled from transmission of the one or more incremental database updates to the remote volume at the remote site (See column 6, lines 1-14).

West et al. does not teach destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote; volume as indicated by one or more bits in the second bitmap.

Milillo et al. teaches a system and method for synchronizing a data copy using an accumulation remote copy trio consistency group (See abstract), in which he teaches

(a) destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data (See column 2, lines 44-53, lines 58-67);

(b) transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update (See column 4, lines 47-60; column 8, lines 42-60); and

(c) synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote; volume as indicated by one or more bits in the second bitmap (See column 2, lines 43-67; column 4, lines 47-60),

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified West et al., to include destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote; volume as indicated by one or more bits in the second bitmap.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified West et al., by the teachings of Milillo et al. because destaging modified data to the primary volume for a current database update and updating one or more bits in a first bitmap at the primary site that indicate one or more tracks on the primary volume that are to be overwritten with the modified data; transferring the first bitmap to a second bitmap at the primary site for indicating the modified data that is to be transmitted to the remote volume at the remote site for the current database update; and synchronizing the primary volume at the primary site with the remote volume at the remote site for the current database update by transmitting the modified data to the remote; volume as indicated by one or more bits in the second bitmap would migrate data to a secondary storage system having multiple volumes for disaster recovery purposes much quicker to facilitate smaller incremental backups (See Milillo et al., column 3, lines 19-28).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mellissa M Chojnacki whose telephone number is 730-305-8769. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-305-3830. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mmc
July 21, 2004

SAM RIMELL
PRIMARY EXAMINER